20. The igniter of claim 1 wherein the booster zone path length is from about 0.1 to about 2 cm.

21. The igniter of claim 1 wherein the booster zone path length is from 0.2 to 1 cm.

22. The igniter of claim 1 wherein the igniter comprises a central heat sink zone.

23. The igniter of claim 22 wherein the igniter comprises a heat zone interposed between conductive, booster and hot zones of the igniter.

REMARKS

Claims 1, 4, 5, 7-11, 14 and 17 have been amended, and claims 19-23 have been added. No new matter has been added by virtue of the amendments. For instance, support for the amendment of claim 1 and new claims 19-21 appears e.g. at page 17, lines 9-11 and page 12, lines 13-19 of the application. Support for new claims 22 and 23 appears at page 8, lines 11-13; page 9, lines 24-26; and the drawings of the application.

It is believed the amendments made herein obviate the objection under Rule 75(c) (non-substantive matter of form).

Before addressing the rejection over the Axelson document in detail, a brief discussion of Applicant's invention may be helpful.

The invention is directed to ceramic igniter devices that have a first conductive zone of relatively low resistance, a power enhancement zone of intermediate resistance, and a further hot or ignition zone of high resistance.

Applicant has surprisingly discovered that igniters of the invention can provide extremely fast time-to-ignition temperatures, include ignition times of less than 1.5 seconds, or even 1 second or less. This is demonstrated for instance by the results shown in Example 2 of the application.

Such results are clearly significant. Applicant's preferred rapid-ignition ceramic igniters can replace spark ignition systems where an extremely fast time-to-temperature is required, e.g. for an ignition source for instantaneous water heating systems, cooltops, and the like.

Additionally, Applicant has found that an excessive hot zone path length can compromise performance, particularly the time required to reach ignition temperature. Independent claim 1 recites that the hot zone path length is 2 cm or less.

Claims 1-3, 12 and 13 were rejected under 35 U.S.C. 102 over Axelson (U.S. Patent 5,705,261) or, in the alternative, under 35 U.S.C. 103 over Axelson (U.S. Patent 5,705,261) in view of Willkens (U.S. Patent 5,786,565).

The rejection is traversed.

The Axelson patent recites a portion 14 that is described as being preferably omitted for ease of manufacture. See the cited Axelson patent at col. 4, lines 30-32. In the Examples of the Axelson patent, an intermediate zone is not described. Note the Axelson patent at column 5, lines 50-55, where an intermediate zone is not mentioned.

Indeed, the Axelson patent nowhere contemplates the effect and performance that can be provided by Applicant's claimed booster zone region, including the exceptionally fast time-to-ignition temperatures that are demonstrated in Example 2 of the application.

The Axelson patent also does not mention lengths of a hot zone or an intermediate zone. The Axelson patent also shows a hairpin or "slotted" igniter that does not contain an interposed heat sink zone.

Thus, the Axelson patent does not disclose the hot zone path length, or the significance thereof, as Applicant discloses and claims. Nor does the Axelson patent mention the booster zone path lengths as recited in Applicant's claims 20-21, or an interposing heat sink zone (i.e. a "slotless" construction) as recited in Applicant's claims 22-23.

Accordingly, the rejections should be withdrawn. See, for instance, *In re Marshall*, 198 USPQ at 346 ("[r]ejections under 35 U.S.C. 102 are proper only when the claimed subject matter is identically disclosed or described in the prior art."). See also Section 2143.03 of the Manual of Patent Examining Procedure ("To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art.").

It is believed the application is in condition for immediate allowance, which action is earnestly solicited.

Respectfully submitted,

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MARKED VERSION TO SHOW CHANGES

1. (amended) A sintered ceramic igniter element comprising a conductive zone, a power booster zone, and a hot zone,

the booster zone having a PTCR and a resistivity greater than the conductive zone and less than the hot zone,

the hot zone having a resisitivity greater than the booster zone,

wherein the hot zone path length is about 2 cm or less.

4. (amended) An igniter element of claim 1 [any one of clam 1 through 3] wherein the igniter comprises in sequence the conductive zone, the booster zone and the hot zone.

5. (amended) An igniter of claim 1 [any one of claims 1 through 4] wherein the three zones differ in operational temperature during use of the igniter.

9. (amended) An igniter element of claim 1 [any one of claims 1 through 8] wherein the room temperature resistivitance of the conductor zone is less than about 50 percent of the room temperature resistivitance of the booster zone.

10. (amended) An igniter element of claim 1 [any one of claims 1 through 8] wherein the room temperature resistivitance of the booster zone is less than about 70 percent of the room temperature resistivitance of the hot zone.

11. (amended) An igniter element of claim 1 [any one of claims 1 through 10] wherein the operational temperature resistivity of the booster zone is at least about 50 percent greater than the operational temperature resistivity of the hot zone.

14. (amended) A method of igniting gaseous fuel, comprising applying an electric current across an igniter an igniter of claim 1 [any one of claims 1 through 13].

17. (amended) A heating apparatus comprising an igniter of claim 1 [any one of claims 1 through 13].